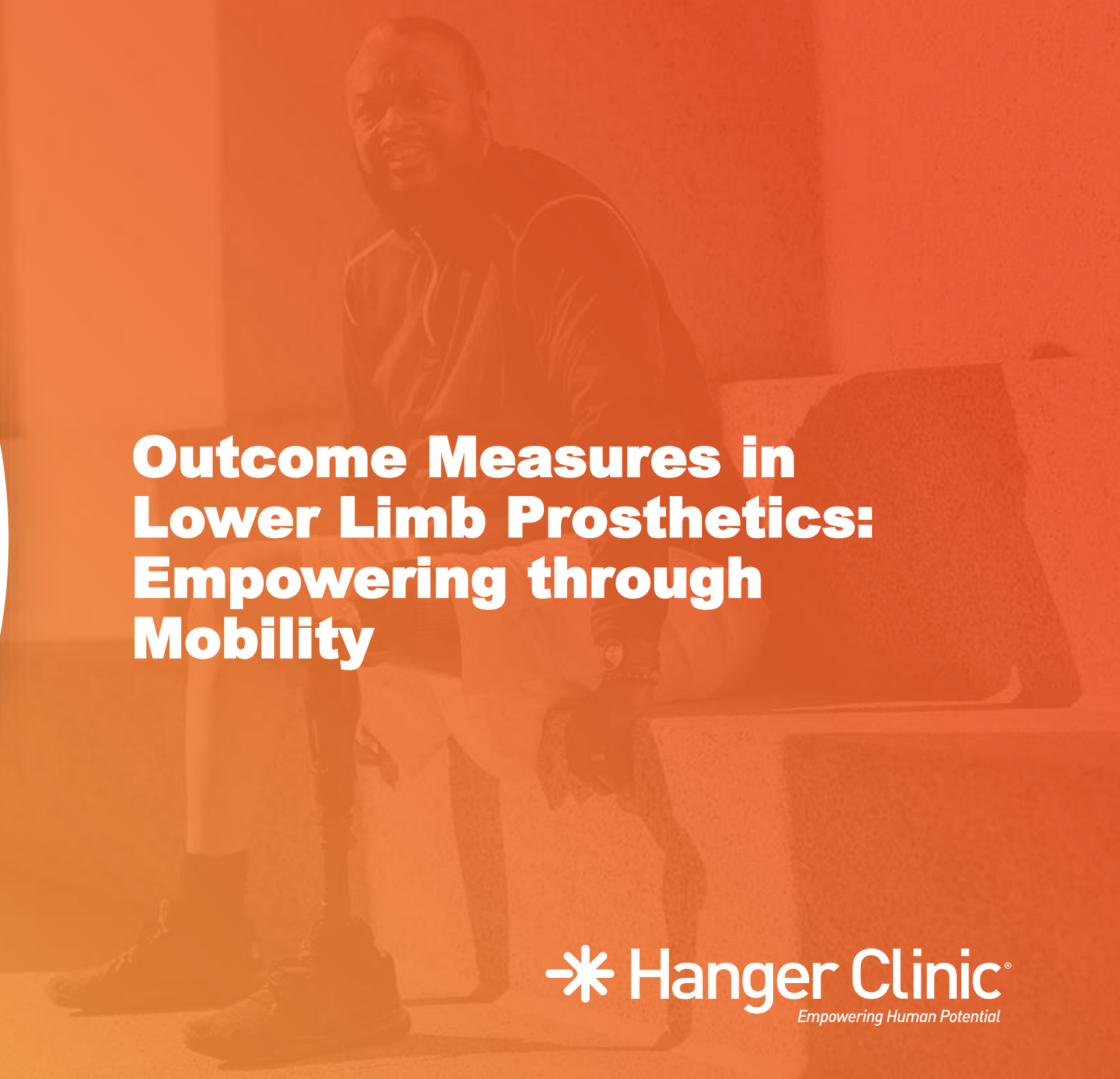
Outcome Measures in Lower Limb Prosthetics: Empowering through Mobility



Hanger Clinic®
Empowering Human Potential

Disclosure Statements

I have the following relevant relationships in the products or services described, reviewed, evaluated or compared in this presentation.

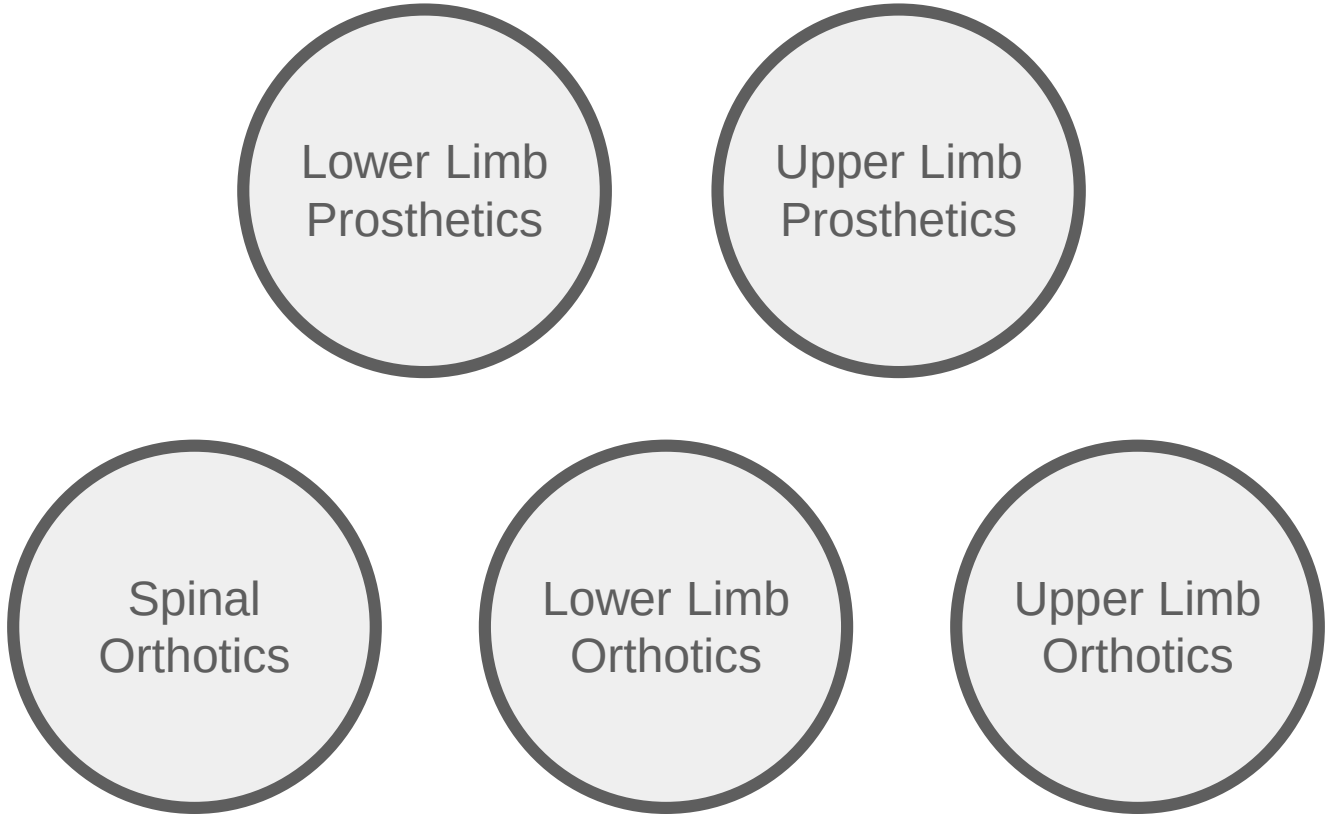
Hanger Clinic

- Our moderator and prosthetist joining us today are paid employees of Hanger Clinic.

Other Disclosures (if any):

- None

Hanger Clinic
Continuing Education Program



Learning Outcomes

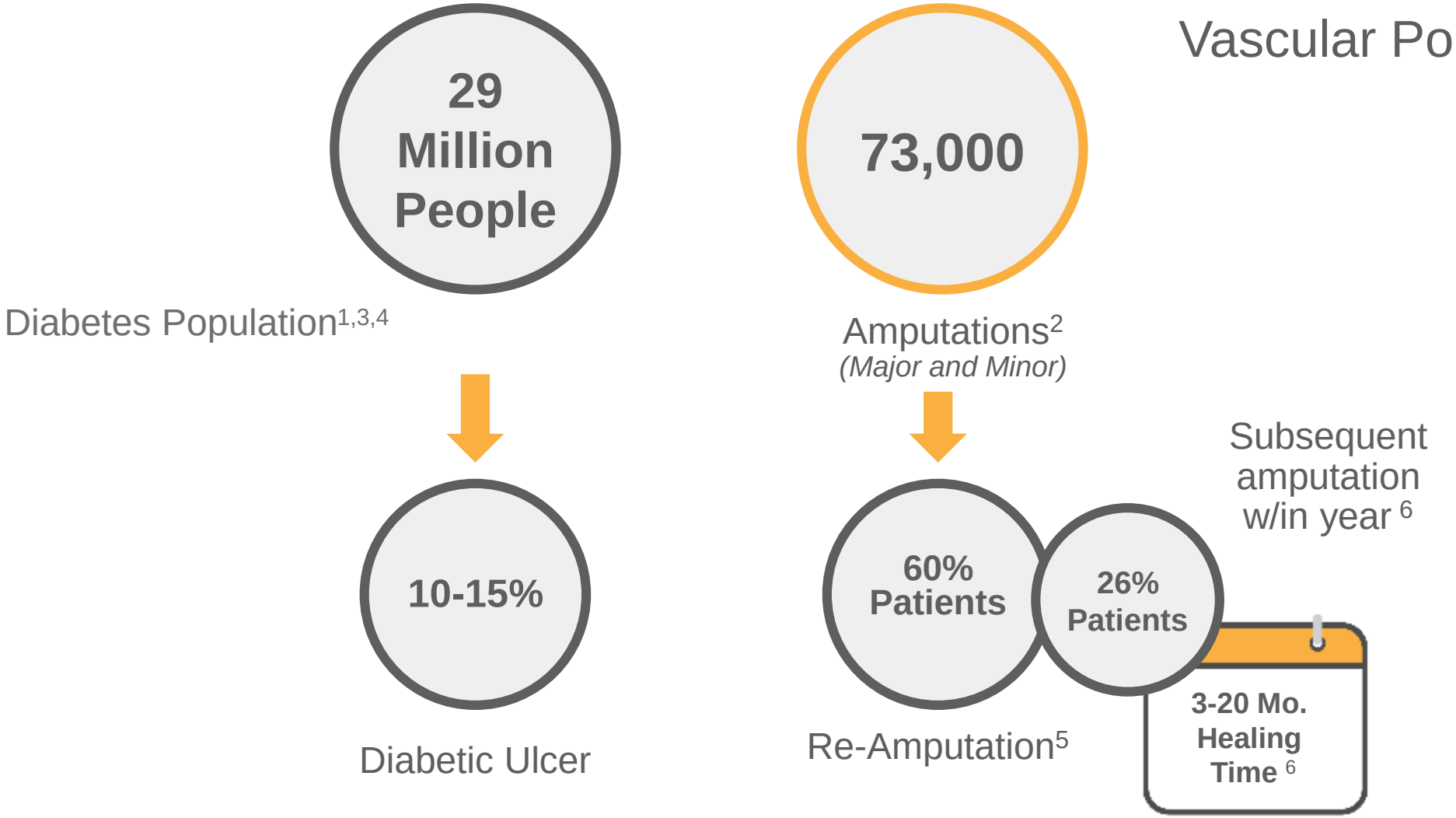
Upon completion of this presentation the participant will be able to:

- Identify trends in adult limb loss populations
- Demonstrate the value in a health care team approach to limb loss patient care
- Communicate the benefits of using outcome measures with lower limb prosthetic patients
- Discuss the Prosthetics Limb User Survey of Mobility (PLUS-M™) assessment
- Review sample patient case studies and best practice approach to rehabilitation and a successful care plan

Agenda

- Patient Profiles: What we know and how to work together
- Lower limb prosthetic outcomes and PLUS-MTM tool
- Practice: Case studies and learn how a prosthetic company is translating data into clinical care
- Discussion

Limb Loss Patient Population: 2 Million



Ziegler-Graham, K. Archives of Physical Medicine and Rehabilitation (2008)
Further Citations in Reference List (see subscript)

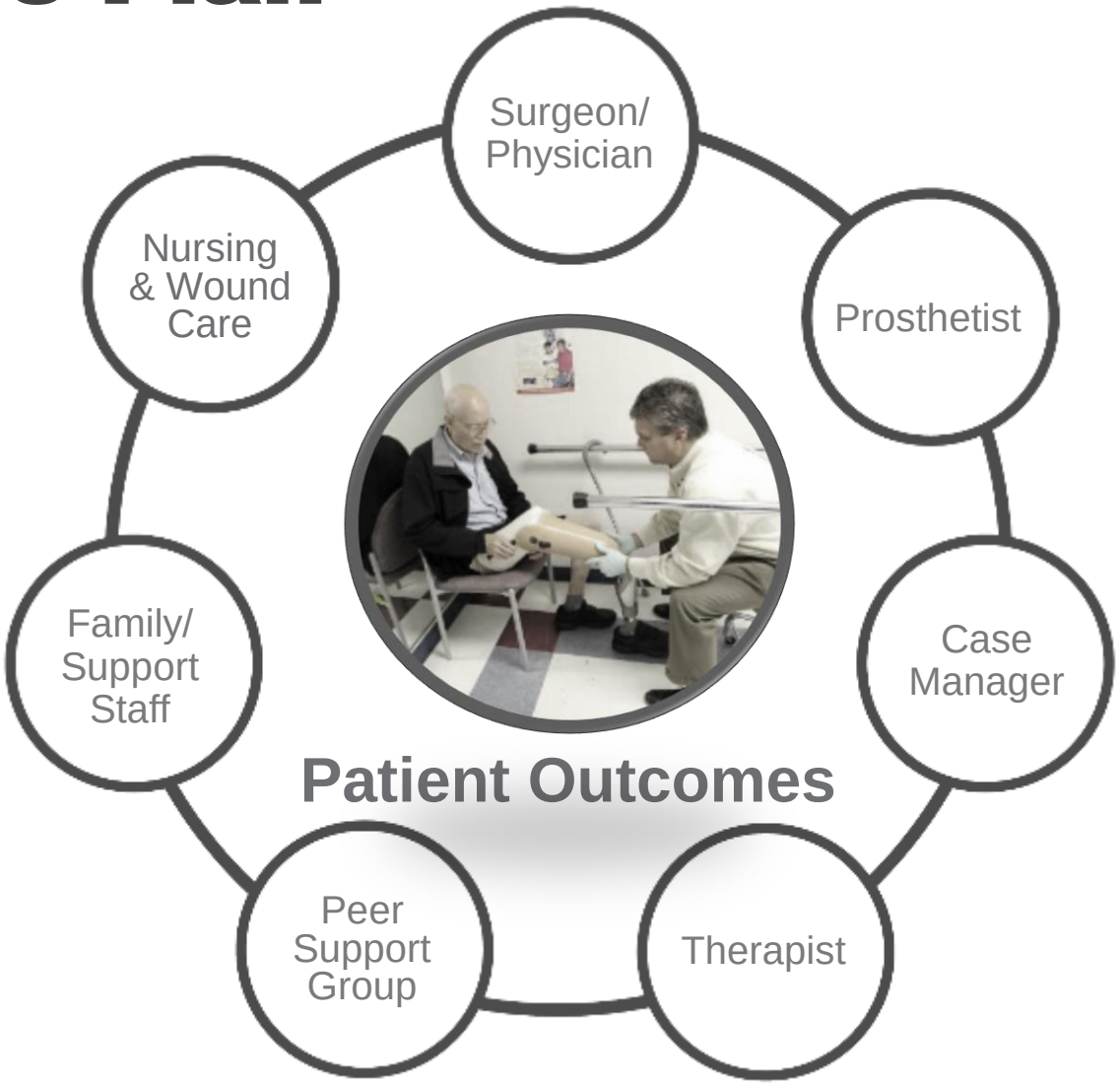
Limb Loss Patient Population: 2 Million

Trauma Population

- More than 30,000 traumatic amputations yearly
- The 3 most common mechanisms of injury are crush, guillotine and avulsion
- Approximately 80% are male
- Majority are between the ages of 15-40
- Typically are in overall good health

Ziegler-Graham K. Archives of Physical Medicine and Rehabilitation (2008)
McNutt, Amputee Coalition. (2010)

Team Care Plan



Why Track Mobility Outcomes: More Consistent Care

START OF EPISODE CARE

- Assess patient's current mobility

2 WEEKS AFTER PROSTHETIC DELIVERY

- Assess immediate impact of prosthetic care

EVERY 6 MONTHS

- Assess long term impact of our care
- Continuously monitor patient's mobility
- Early, proactive intervention when needed

Image courtesy of www.oandp.org

Outcome Measures: PLUS-M™ and Prosthetic Evaluation Questionnaire

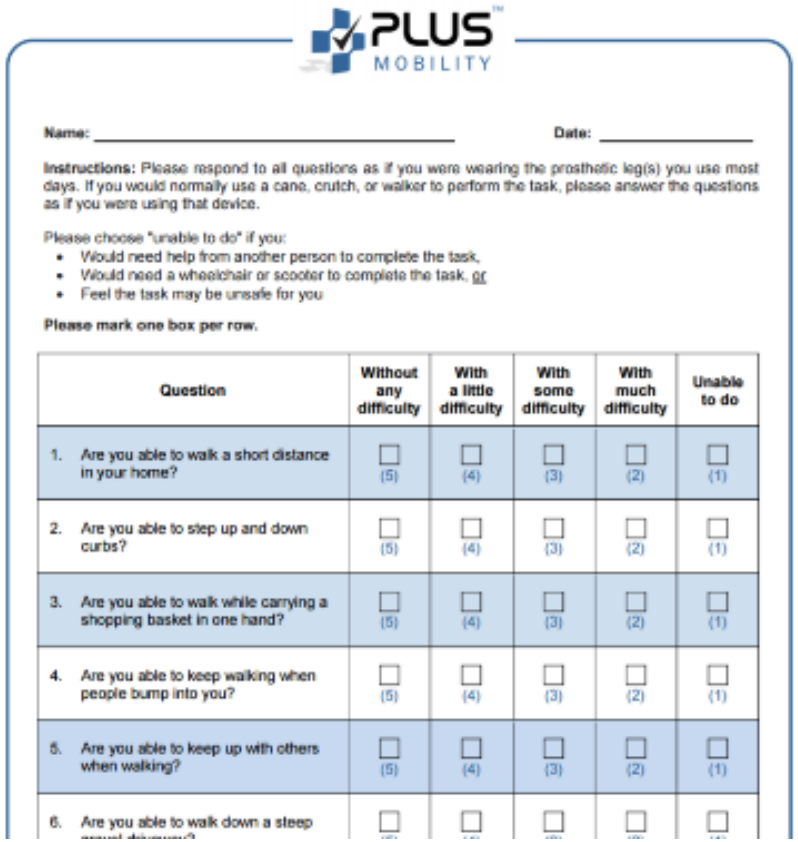
Lower Limb Prosthetic Outcomes

WHAT:

- Prosthetics Limb Users Survey of Mobility (PLUS-M™)
- Self-reported instrument to measure mobility of adult with lower limb amputation
- Intended use: research and clinical care
- Uni/bi-lateral, various levels, current prosthesis users, ≥18

WHO:

- University of Washington Center on Outcomes Research in Rehabilitation
- National Institutes of Health
- Prosthetics Research Study



PLUS™ MOBILITY

Name: _____ Date: _____

Instructions: Please respond to all questions as if you were wearing the prosthetic leg(s) you use most days. If you would normally use a cane, crutch, or walker to perform the task, please answer the questions as if you were using that device.

Please choose "unable to do" if you:

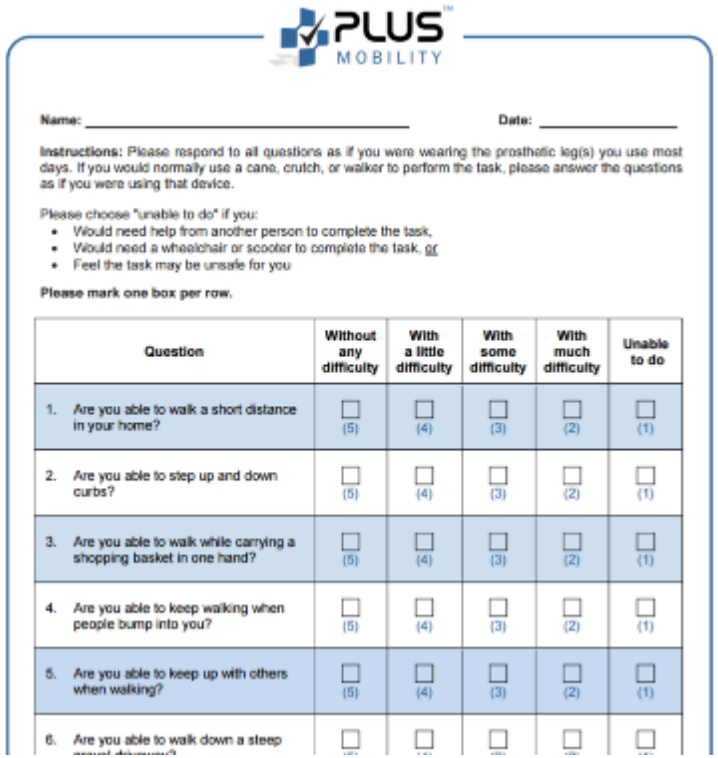
- Would need help from another person to complete the task,
- Would need a wheelchair or scooter to complete the task, or
- Feel the task may be unsafe for you

Please mark one box per row.

Question	Without any difficulty	With a little difficulty	With some difficulty	With much difficulty	Unable to do
1. Are you able to walk a short distance in your home?	☐ (5)	☐ (4)	☐ (3)	☐ (2)	☐ (1)
2. Are you able to step up and down curbs?	☐ (5)	☐ (4)	☐ (3)	☐ (2)	☐ (1)
3. Are you able to walk while carrying a shopping basket in one hand?	☐ (5)	☐ (4)	☐ (3)	☐ (2)	☐ (1)
4. Are you able to keep walking when people bump into you?	☐ (5)	☐ (4)	☐ (3)	☐ (2)	☐ (1)
5. Are you able to keep up with others when walking?	☐ (5)	☐ (4)	☐ (3)	☐ (2)	☐ (1)
6. Are you able to walk down a steep	☐	☐	☐	☐	☐

PLUS-M™: Valid and Reliable

- Valid and Reliable: what and how
- Rigorously developed using modern psychometric methodology
- Numerous publications and abstracts



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6. Are you able to walk down a steep	☐	☐	☐	☐	☐

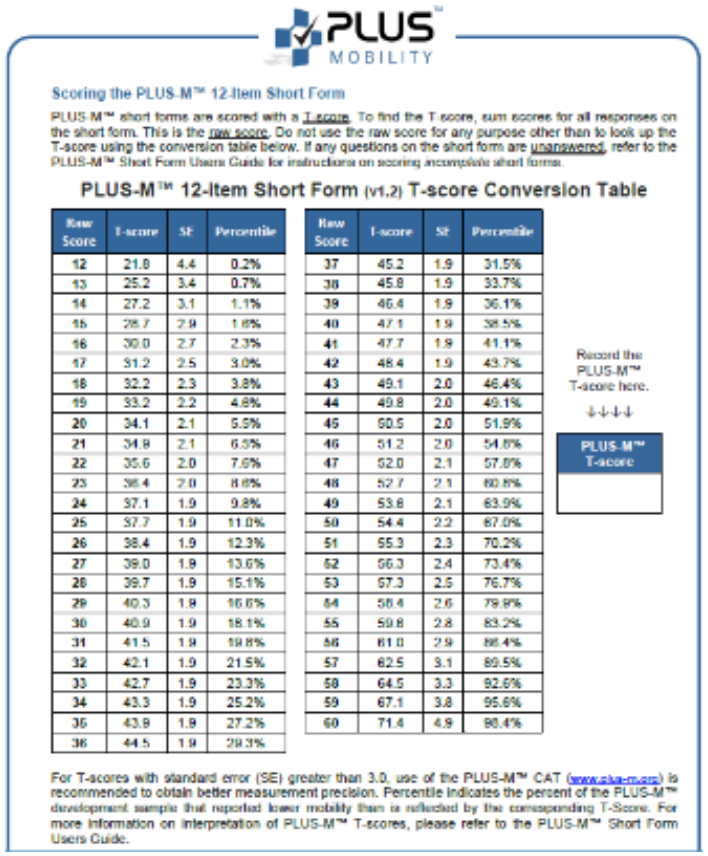
PLUS-M™: Validation Study

The PLUS-M™ was validated against established measures of physical function, mobility and balance and was correlated with:

- Amputee Mobility Predictor™ (AMP)
- Timed Up and Go (TUG)
- PEQ-MS
- ABC
- PROMIS-PF

The PLUS-MTM

- Intra-class coefficient (ICC) greater than 0.9
- Indicating appropriate use for individual level monitoring of patients
- Better than many other patient-report instruments including the ABC, PROMIS and PEQ-MS



PLUS MOBILITY

Scoring the PLUS-M™ 12-Item Short Form

PLUS-M™ short forms are scored with a T-score. To find the T-score, sum scores for all responses on the short form. This is the raw score. Do not use the raw score for any purpose other than to look up the T-score using the conversion table below. If any questions on the short form are unanswered, refer to the PLUS-M™ Short Form Users Guide for instructions on scoring incomplete short forms.

PLUS-M™ 12-Item Short Form (v1.2) T-score Conversion Table

Raw Score	T-score	SE	Percentile
12	21.8	4.4	0.2%
13	25.2	3.4	0.7%
14	27.2	3.1	1.1%
15	28.7	2.9	1.6%
16	30.0	2.7	2.3%
17	31.2	2.5	3.0%
18	32.2	2.3	3.8%
19	33.2	2.2	4.6%
20	34.1	2.1	5.5%
21	34.9	2.1	6.5%
22	35.6	2.0	7.6%
23	36.4	2.0	8.6%
24	37.1	1.9	9.8%
25	37.7	1.9	11.0%
26	38.4	1.9	12.3%
27	39.0	1.9	13.6%
28	39.7	1.9	15.1%
29	40.3	1.9	16.6%
30	40.9	1.9	18.1%
31	41.5	1.9	19.8%
32	42.1	1.9	21.5%
33	42.7	1.9	23.3%
34	43.3	1.9	25.2%
35	43.9	1.9	27.2%
36	44.5	1.9	29.3%
37	45.2	1.9	31.5%
38	45.8	1.9	33.7%
39	46.4	1.9	36.1%
40	47.1	1.9	38.5%
41	47.7	1.9	41.1%
42	48.4	1.9	43.7%
43	49.1	2.0	46.4%
44	49.8	2.0	49.1%
45	50.5	2.0	51.9%
46	51.2	2.0	54.8%
47	52.0	2.1	57.8%
48	52.7	2.1	60.8%
49	53.6	2.1	63.9%
50	54.4	2.2	67.0%
51	55.3	2.3	70.2%
52	56.3	2.4	73.4%
53	57.3	2.5	76.7%
54	58.4	2.6	79.8%
55	59.8	2.8	83.2%
56	61.0	2.9	86.4%
57	62.5	3.1	89.5%
58	64.5	3.3	92.6%
59	67.1	3.8	95.6%
60	71.4	4.9	98.4%

Record the PLUS-M™ T-score here.

PLUS-M™ T-score

For T-scores with standard error (SE) greater than 3.0, use of the PLUS-M™ CAT (www.pluss-m.com) is recommended to obtain better measurement precision. Percentile indicates the percent of the PLUS-M™ development sample that reported lower mobility than is reflected by the corresponding T-Score. For more information on interpretation of PLUS-M™ T-scores, please refer to the PLUS-M™ Short Form Users Guide.

PLUS-M™: T-Score

- What is it?
- How it works
- What does the output look like?
- T-Score and Medical Records

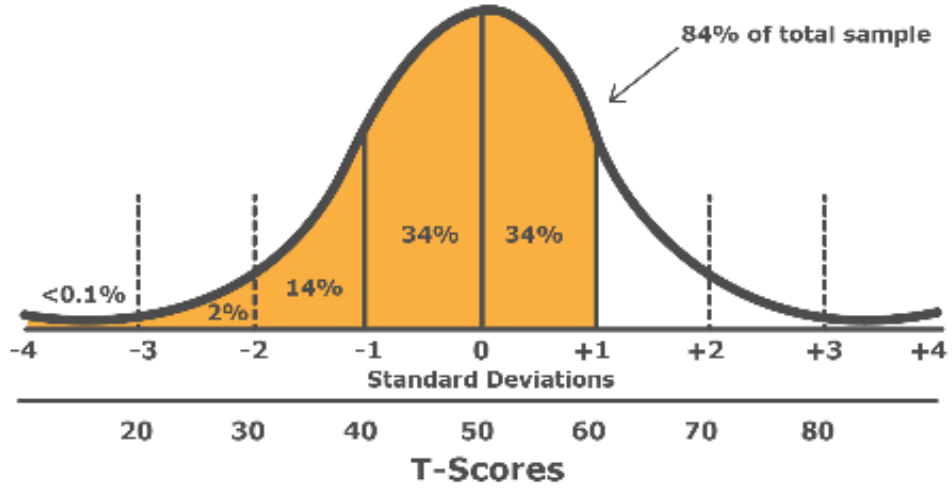


Figure 1 - A PLUS M™ T-Score of 60 indicates that approximately 84 percent of persons in the development sample reported lower mobility, as reflected by the shaded area.

PLUS MOBILITY

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18	32.2	2.3	3.8%
19	33.2	2.2	4.6%
20	34.1	2.1	5.5%
21	34.9	2.1	6.5%
22	35.6	2.0	7.6%
23	36.4	2.0	8.6%
24	37.1	1.9	9.8%
25	37.7	1.9	11.0%
26	38.4	1.9	12.3%
27	39.0	1.9	13.6%
28	39.7	1.9	15.1%
29	40.3	1.9	16.6%
30	40.9	1.9	18.1%
31	41.5	1.9	19.8%
32	42.1	1.9	21.5%
33	42.7	1.9	23.3%
34	43.3	1.9	25.2%
35	43.9	1.9	27.2%
36	44.5	1.9	29.3%
37	45.2	1.9	31.5%
38	45.8	1.9	33.7%
39	46.4	1.9	36.1%
40	47.1	1.9	38.5%
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44	49.8	2.0	49.1%
45	50.5	2.0	51.9%
46	51.2	2.0	54.8%
47	52.0	2.1	57.8%
48	52.7	2.1	60.8%
49	53.8	2.1	63.9%
50	54.4	2.2	67.0%
51	55.3	2.3	70.2%
52	56.3	2.4	73.4%
53	57.3	2.5	76.7%
54	58.4	2.6	79.8%
55	59.8	2.8	83.2%
56	61.0	2.9	86.4%
57	62.5	3.1	89.5%
58	64.5	3.3	92.6%
59	67.1	3.8	95.6%
60	71.4	4.9	98.4%

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PLUS-M™ T-score

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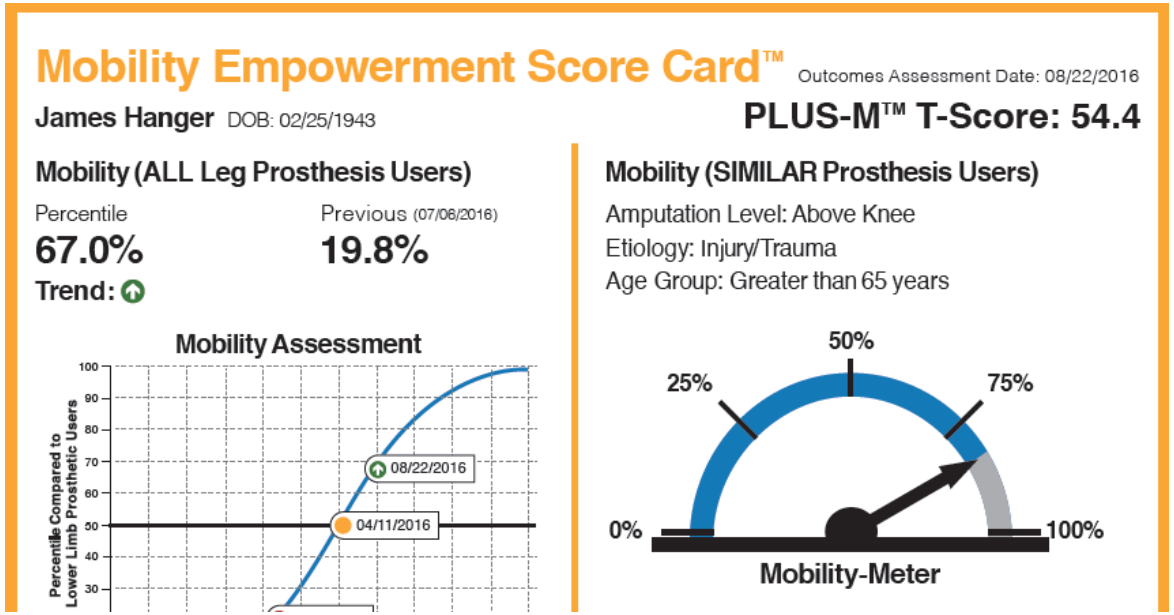
Prosthesis Evaluation Questionnaire – Well Being Subsection

- Development: Prosthetics Research Study
- Support for PEQ provided by US Department of Veterans Affairs
- Questionnaire divided into groups: Well-Being Subsection

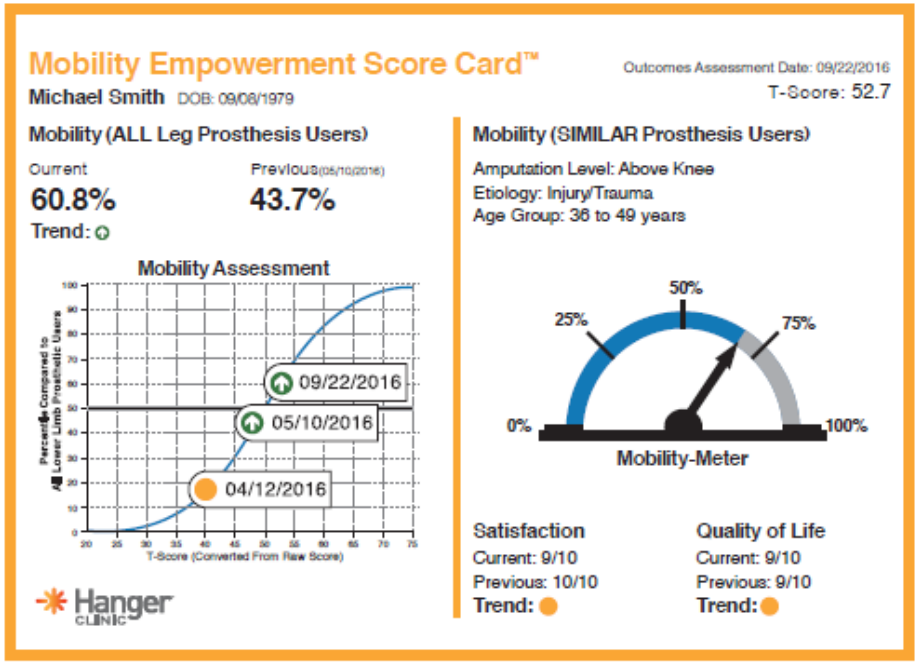
Scoring is based on PRS coding and scale



Translating data to clinical care by a large prosthetic company

Mobility Empowerment Score Card: Tracking Mobility Sample

- Measures mobility utilizing PLUS-M™
- Tracks each patient's ME score over-time
- Monitors patient's care satisfaction (PEQ)
- Patients are advised on their progress



Tracking Mobility Sample

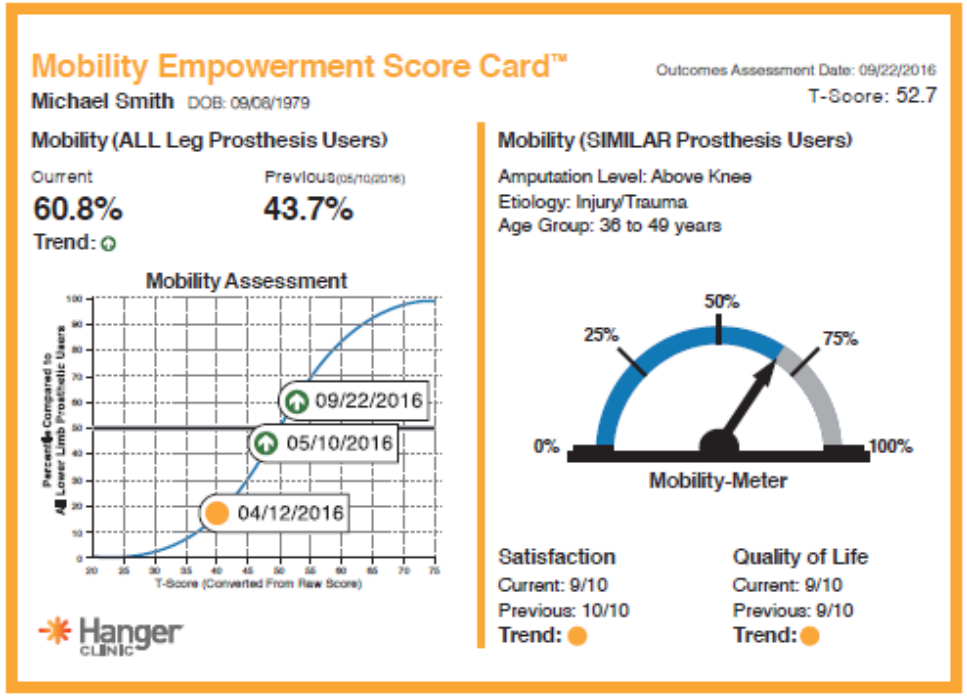
Practice

Case Studies: Transforming Patient Care

Outcomes Tracking Establishes Baseline For Mobility Improvements

Sample Case Study:

- Young traumatic patient
- Reports below average mobility at evaluation for socket replacement
- Receives new socket
- Improvements after 2 weeks
- 6 month follow-up

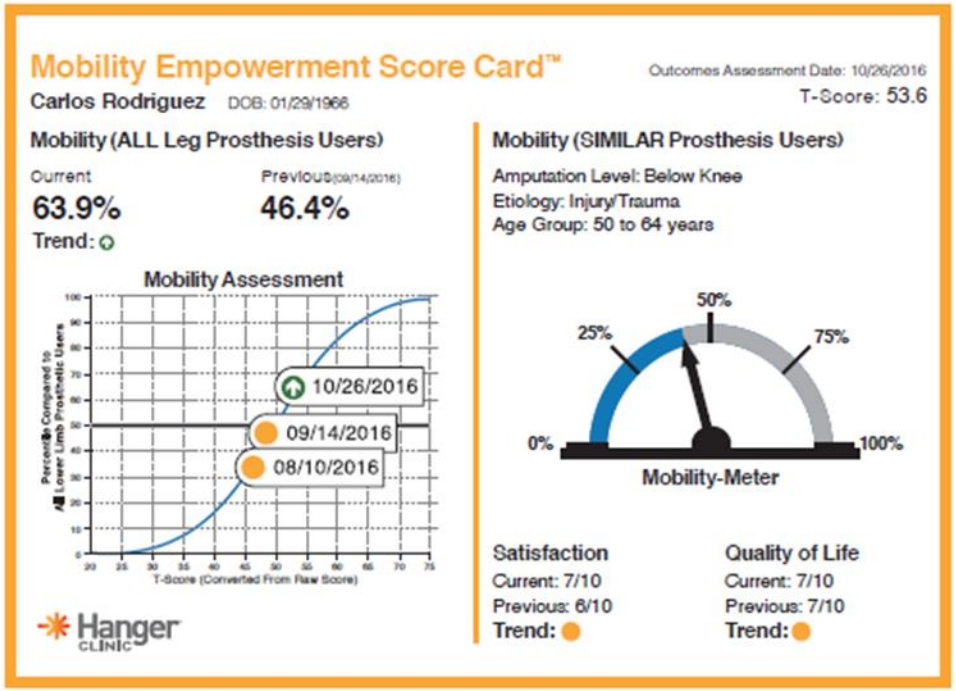


Case Studies: Transforming Patient Care

Assessment Improves Care And Results In Higher Mobility

Sample Case Study:

- Age: 50 to 64
- Etiology: Trauma
- Clinician observes issue requiring referral to PMR for eval
- Patient returned 914 with Rx for replacement
- Post-delivery appointment

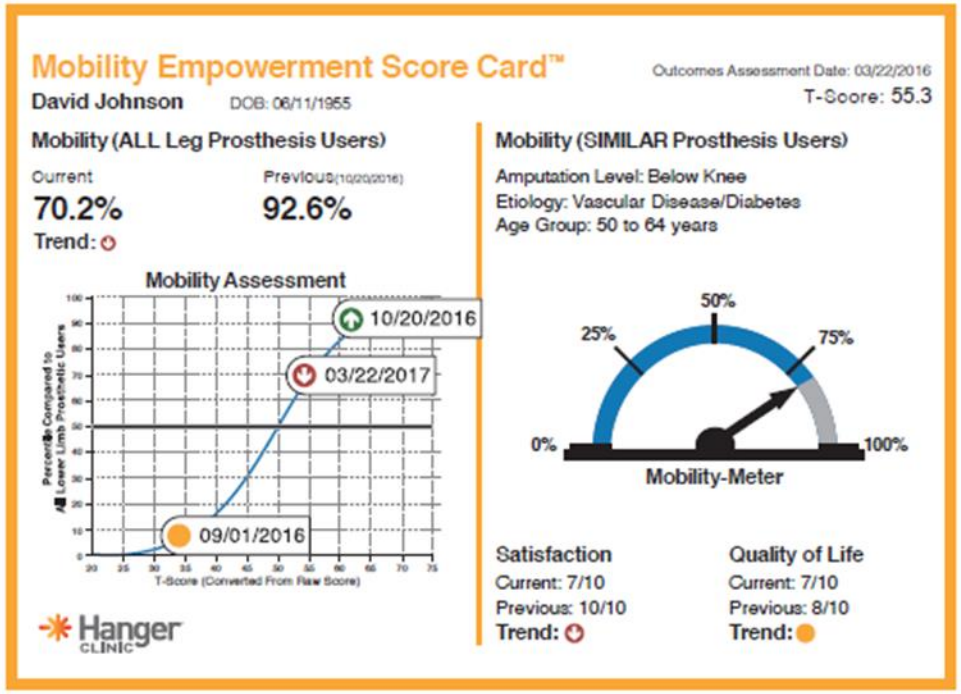


Case Studies: Transforming Patient Care

Ongoing Monitoring Enables Early Intervention

Sample Case Study:

- Age: 50 to 64
- Etiology: Vascular Disease/Diabetes
- What are the trends?
- Declines in high mobility patient following illness



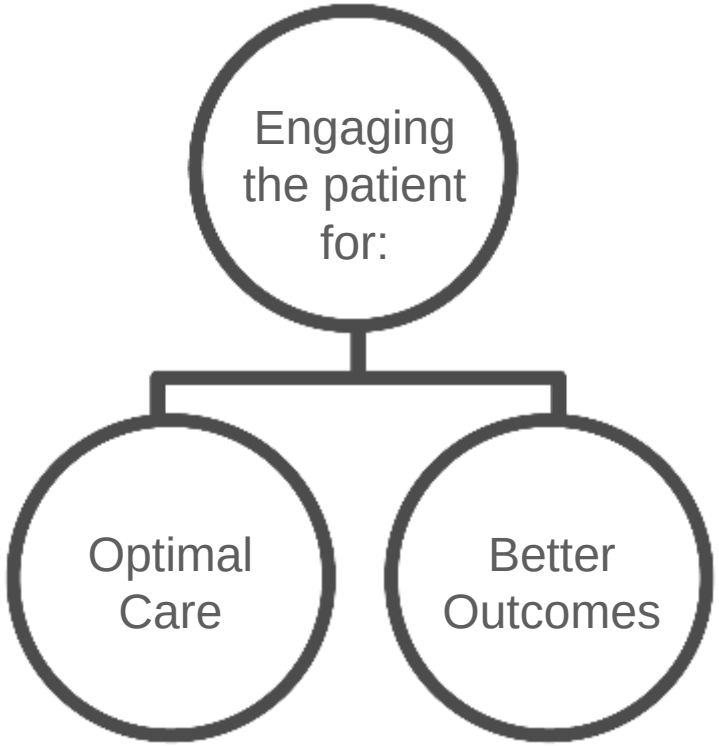
How outcomes data can help?

Assessment can help direct care to increase mobility

Peer comparisons helps to manage patient expectations

Ongoing monitoring enables early intervention

Mobility tracking directs efficient care plan



Research

Research Insights

Our landmark research helps us develop insights-based clinical programs designed to improve patient outcomes, set a national standard of care, and drive the O&P profession forward.

MOBILITY ANALYSIS OF AMPUTEES (MAAT)

Led by our Department of Clinical & Scientific Affairs, the MAAT series is one of the largest multicenter retrospective analyses of mobility among lower limb prosthetic patients evaluating satisfaction, quality of life, comorbid health conditions, and prosthetic component choices.

MAAT 1:

Maximizing mobility through prosthetic rehabilitation positively impacts quality of life and satisfaction.

Prosthetics and Orthotics International, Oct. 2017

MAAT 2:

Comorbidities including diabetes, osteoporosis, heart failure, COPD, and obesity, do not significantly impact prosthetic mobility.

American Journal of Physical and Rehabilitation, Nov. 2018

MAAT 3:

Microprocessor knee technology improves mobility for above-knee limb loss patients and cuts in half the functional gap between below-knee and above-knee users.

Assistive Technology The Official Journal of RESNA, Dec. 2018

MAAT 4:

A classification tree analysis was developed to effectively predict the probability of a lower limb prosthetic patient's functional potential and inform K-Level designation.

Disability and Rehabilitation: Assistive Technology, Feb. 2019

MAAT 5:

Prosthetic ankle-foot selection directly impacts functional mobility for patients with an amputation due to diabetes and/or vascular disease.

Journal of Rehabilitation and Assistive Technologies Engineering, Feb. 2019

MAAT 6:

Patients with vascular disease / diabetes who remained actively engaged in prosthetic rehabilitation as far out as 7 years post-amputation experienced high levels of quality of life, satisfaction, and sustained mobility.

Journal of Prosthetics and Orthotics, Feb. 2020

Questions and Answers

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